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## PATENT SPECIFICATION

732,035



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No. 31316/53.

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(Patent of Addition to No. 726,801 dated Sept. 5, 1952).

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Index at acceptance:—Class 80(2), D7A4.

## COMPLETE SPECIFICATION

## Improvements in Chain-Shifting Devices for Cycles having a Plurality of Sprocket Wheels

I, TULLIO CAMPAGNOLO, an Italian citizen, of Corso Padova 160, Vicenza (Italy), do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to improvements in chain-shifting devices for cycles having a plurality of sprocket-wheels, the devices being of the kind in which a chain guiding and shifting member is controlled by a cable against the action of a spring and is mounted on a movable side of a parallelogram linkage the opposite side of which is secured by a stirrup to a forked frame member and to the wheel spindle of the cycle. The present invention is an improvement in or a modification of the invention disclosed in my Specification No. 726,801.

My Specification No. 726,801 describes and claims a chain-shifting device for cycles having a plurality of sprocket-wheels, wherein a chain guiding and shifting member mounted on a movable side of a parallelogram linkage, the opposite side of which linkage is secured to a stirrup support for attachment to a forked frame member and to the wheel spindle of the cycle and the said guiding member is constituted by a pulley freely mounted on a pivot rigid with the said movable side of the parallelogram linkage and is controlled by a cable against the action of a spring, and wherein the whole of the said parallelogram linkage is held under the control of a chain tensioning spring provided between the said opposite side of the parallelogram linkage and the said stirrup support, which are hinged together, and there are provided two adjustable screws limiting the movement of the parallelogram linkage in the directions to shift the chain.

According to the present invention the movable side of the articulated parallelogram linkage on which the chain guiding and shifting member is mounted is detachably connected to the member forming the interior side of

the articulated parallelogram, and is capable of rotating about its pivot with the member forming the exterior side of the articulated parallelogram to disengage the said pulley from the chain, and the hinge between the articulated parallelogram and the stirrup support is so constructed that, with the said pulley disengaged from the chain and the said cable disconnected, the chain guiding and shifting member can be rotated about the said hinge to vary the tension of the said chain tensioning spring. By rotating the chain shifting and guiding member on the hinge the said chain tensioning spring can be tightened so that with the detachable connection of the articulated parallelogram reconnected and the said pulley re-engaged with the chain, the chain guiding and shifting member can function as a chain tensioner.

One embodiment of this invention is shown, by way of example, in the accompanying drawings wherein:—

Figure 1 is a side elevation of the chain-shifting device in its position for use,

Figure 2 is an elevation, as seen from the rear of the cycle, with the chain guiding and shifting member in position to shift the chain to the innermost sprocket,

Figure 3 is a similar elevation to Figure 2, showing the detachable connection between the movable side of the parallelogram and the interior side thereof in the detached condition, and the said movable side rotated about its pivot with the exterior side to below the said exterior side,

Figure 4 is an axial section through a tension drum containing the chain tensioning spring and through its hinge with the said stirrup, and

Figure 5 is a transverse section through the said drum.

The chain-shifting device comprises a stirrup 1 for attachment to the cycle wheel spindle and to a forked frame member by means of a bolt 2 and a nut 3. An axle 4 has one end screw-threaded and screwed into a base formed by the stirrup 1, a cylindrical body 5 com-

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prising a tension drum being rotatably mounted on the axle 4. The inner end of the drum, i.e. that nearer to the said base, is rotatably mounted in a cup-shaped bearing cap 6 for maintaining the drum coaxial with the axle 4. A two armed yoke 7 integral with the drum 5 forms one side of an articulated parallelogram linkage and carries members 9 and 10 forming the exterior and interior sides respectively of the parallelogram, each of the members 9 and 10 being pivotally mounted between the yoke arms by a rivet 8 and an antifriction bearing (not shown). A yoke 11 rigid with the support for the pulley of the chain-shifting member forms the remaining side of the parallelogram. The said pulley support comprises two plates 13 tied together by a piece of tube 14 mounted on a bolt 15 provided with a nut 16.

The exterior side 9 of the parallelogram is pivoted to the yoke 11 by a rivet 17, while the pivot between the interior side 10 and the yoke 11 comprises a bolt 18, which can be removed to enable the yoke 11 and the support 13 with the pulley 12 to be turned about the axis of the pivot 17, in the manner illustrated in Figure 3. A spring 19 held on a bolt 20 fixed in one arm of the yoke 7, biases the sides 9 and 10 to move away from the cycle wheel. The control of the articulated parallelogram 7—9—10—11 to effect a change of gear is by a flexible cable 21 slidable in a sheath 22, the cable being kept taut by adjustment of a screw-threaded nipple 23 with a nut 24, which nipple engages in a laterally-extending arm 25 of the drum 5. The cable is fixed to the articulated parallelogram by means of a washer 28 and a bolt 26 engaged in an arm 27 integral with the side 9. Two adjustable stop screws 29 and 30 mounted respectively in a post 31 on the drum 5 and a post 32 on the side 10 constitute two stops limiting the extent of the movement of the articulated parallelogram. The stop screw 29 is held against displacement by a spring 33, and similarly the stop screw 30 is held by a spring 34.

In operation, when the device is mounted in position on a cycle, the pulley 12 engages the chain which is held on one or the other of the different sprocket wheels according to the position of the articulated parallelogram, the chain being held taut by the effect of a spring 35 in the drum 5. The spring 35 is of helical form and is mounted around the axle 4 on which the drum rotates, one end of the spring being engaged in a hole in the said base formed by the stirrup 1 and the other end being engaged in one or other of a series of holes 36 provided on the interior of the head of the drum 5, the tension in the spring 35 being determined by the choice of the hole 36 in which the said other end is engaged. In this embodiment four holes 36 are provided. With the pulley 12 disengaged from the chain

and the cable 21 disconnected, the chain guiding and shifting member can be rotated about the hinge formed by the drum 5 on the axle 4 to vary the tension of the chain tensioning spring 35.

It should be understood that the details of the device may be varied from those which have been shown and described, the arrangement still remaining within the scope of the invention as defined by the claims.

What I claim is:—

1. A chain-shifting device for cycles having a plurality of sprocket wheels which is an improvement in or a modification of the invention claimed in claim 1 of my Specification No. 726,801, wherein the movable side of the articulated parallelogram linkage on which the chain guiding and shifting member is mounted is detachably connected to the member forming the interior side of the articulated parallelogram, and is capable of rotating about its pivot with the member forming the exterior side of the articulated parallelogram to disengage the said pulley from the chain, and the hinge between the articulated parallelogram and the stirrup support is so constructed that, with the said pulley disengaged from the chain and the said cable disconnected, the chain guiding and shifting member can be rotated about the said hinge to vary the tension of the said chain tensioning spring.

2. A chain-shifting device as claimed in claim 1, wherein the detachable connection between the said movable and interior sides of the articulated parallelogram comprises a removable pivot bolt.

3. A chain-shifting device as claimed in claim 1 or 2, wherein the said hinge comprises an axle mounted on a base formed by the said stirrup, and a drum rotatably mounted on the said axle and connected with the articulated parallelogram, and wherein a chain tensioning spring of helical form is mounted around the said axle inside the drum, the spring having one end fixed to the said base formed by the stirrup and its other end fixed to the said drum.

4. A chain-shifting device as claimed in claim 3, wherein the said other end of the spring is fixed to the said drum by its engagement in a hole in the interior of the drum, and the drum is provided with a plurality of such holes spaced around its interior, whereby the tension of the spring can be altered by changing the hole in which the said other end is engaged.

5. A chain-shifting device as claimed in any one of the preceding claims, wherein the control cable comprises a flexible sheath having one end formed as a screw-threaded nipple and engaged in an arm of the said drum.

6. A chain-shifting device as claimed in any one of the preceding claims, wherein the control cable is fixed to the articulated parallelogram by a bolt engaged in an arm of

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the exterior side of the articulated parallelogram, the end of the cable being clamped between the last-mentioned arm and a washer beneath the head of the screw.

hereinbefore described with reference to or as shown in the accompanying drawings.

REDDIE & GROSE,

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5 7. A chain-shifting device substantially as

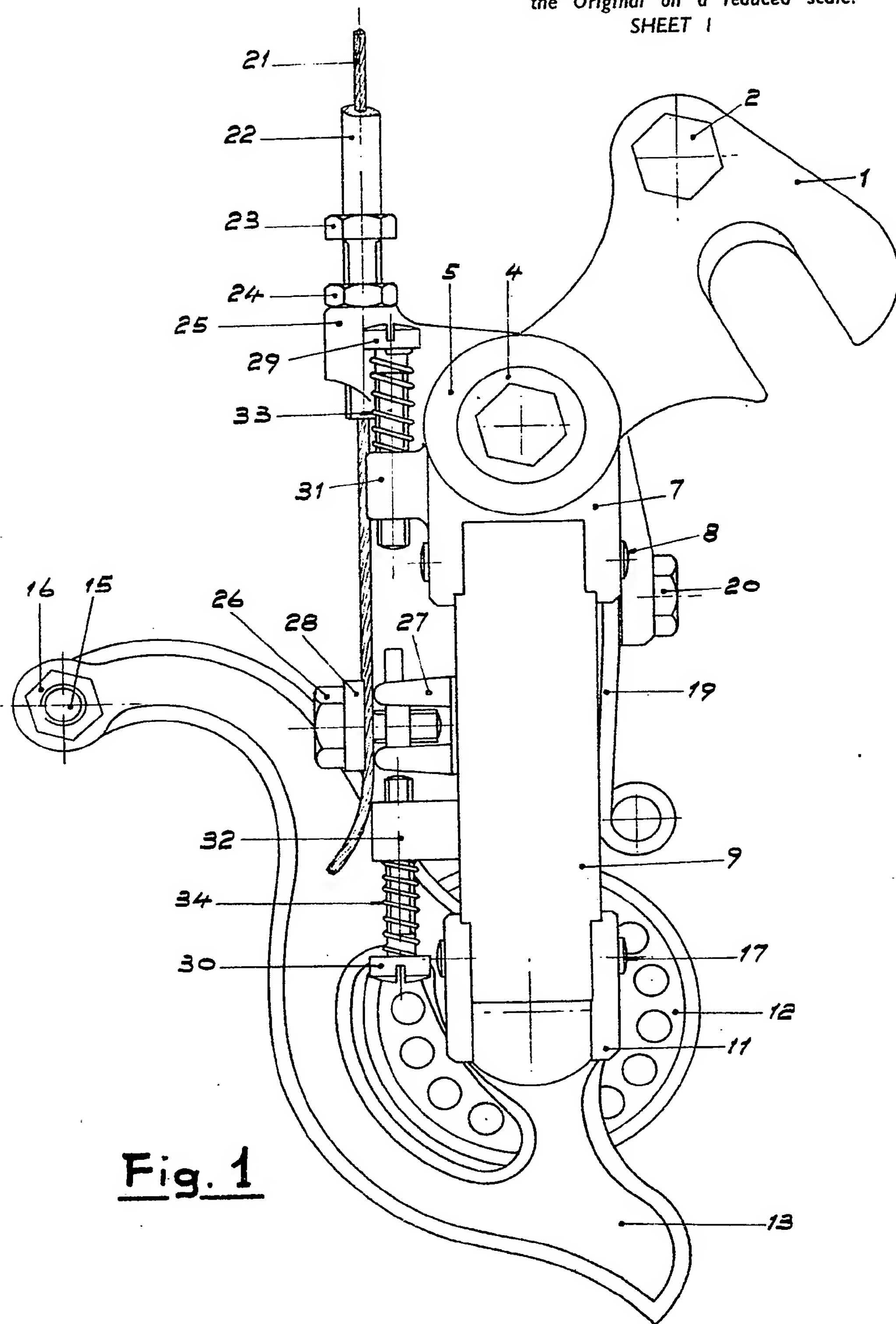
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3 SHEETS

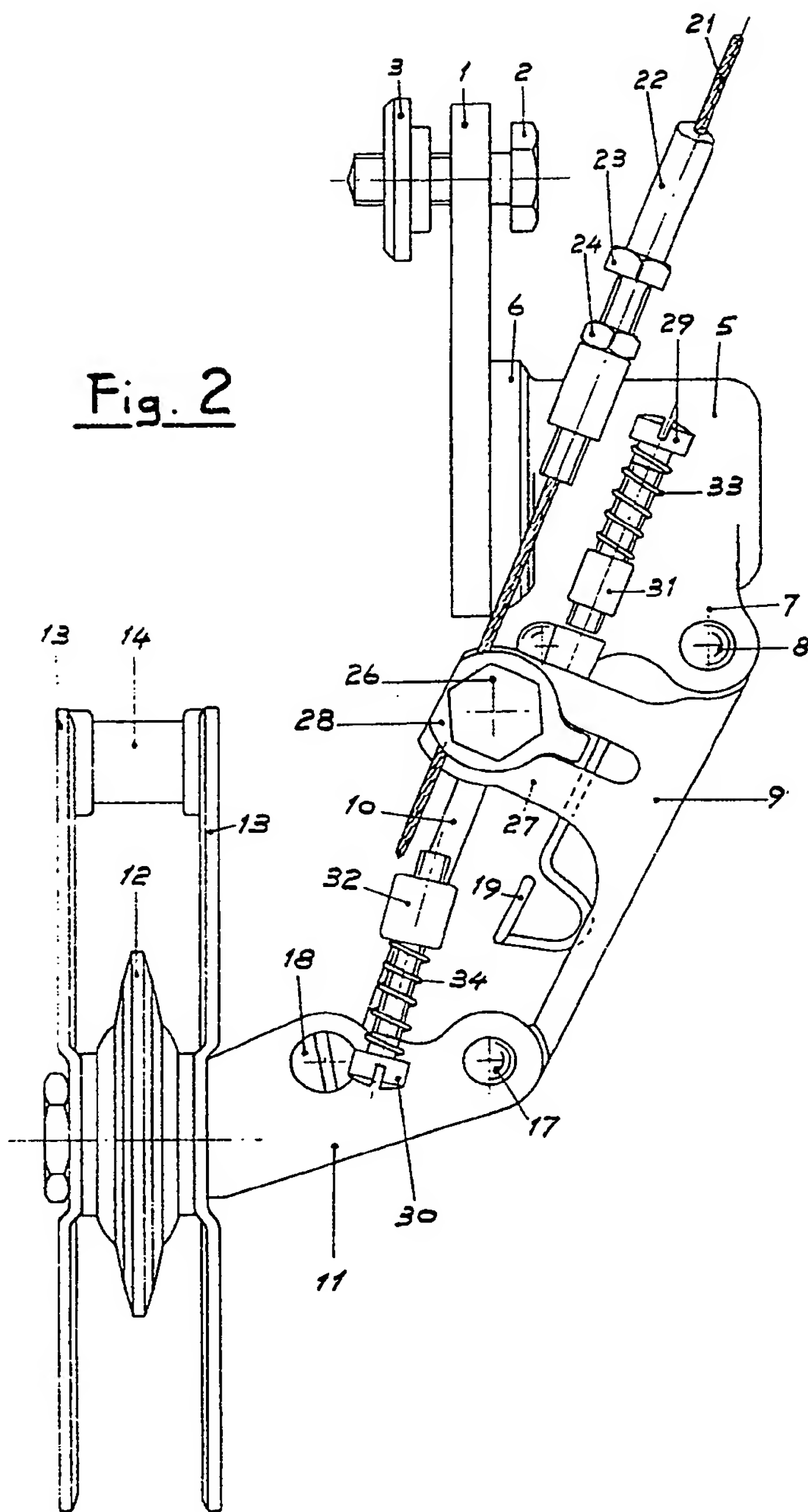
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SHEET 1



**Fig. 1**

Fig. 2





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SHEETS 2 & 3

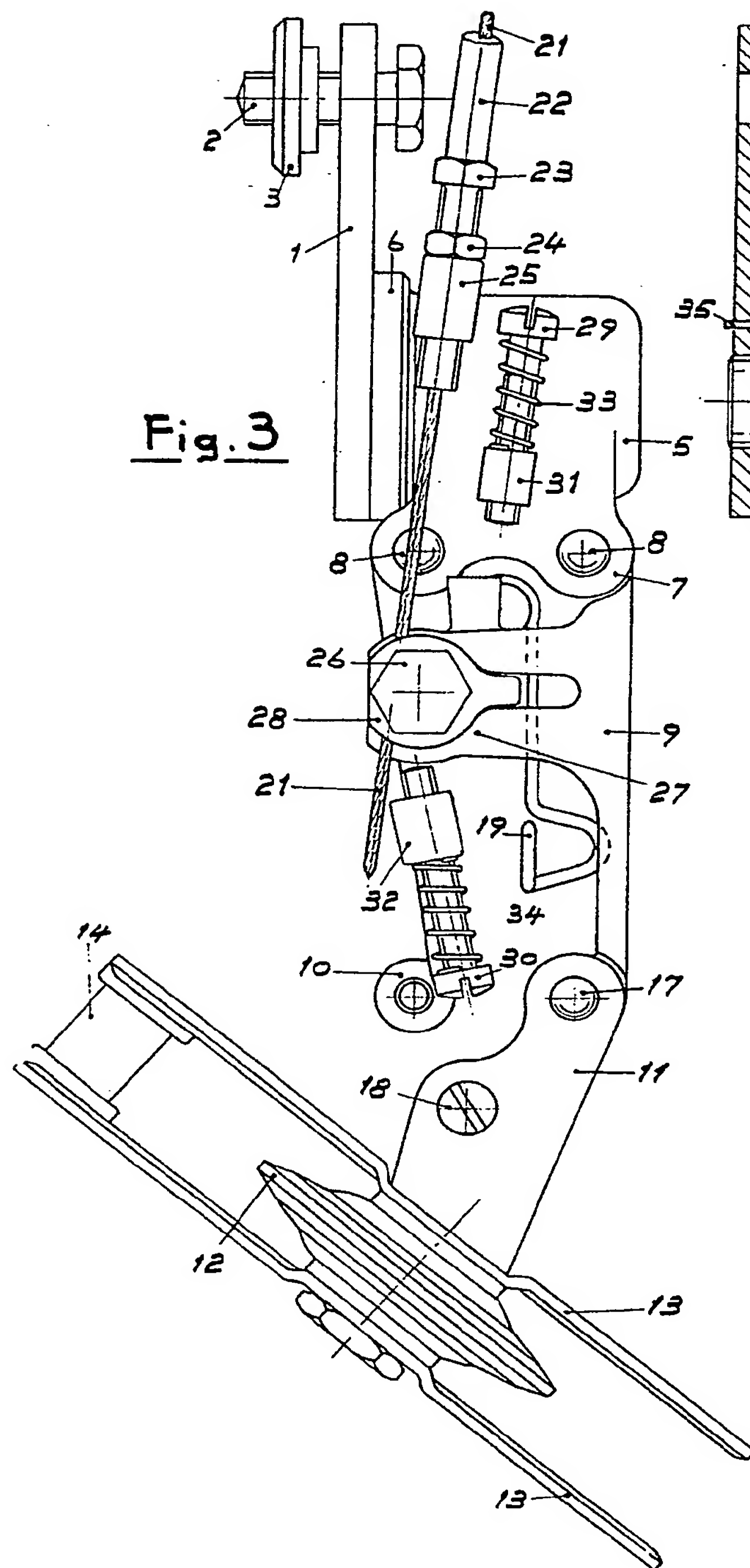


Fig. 3

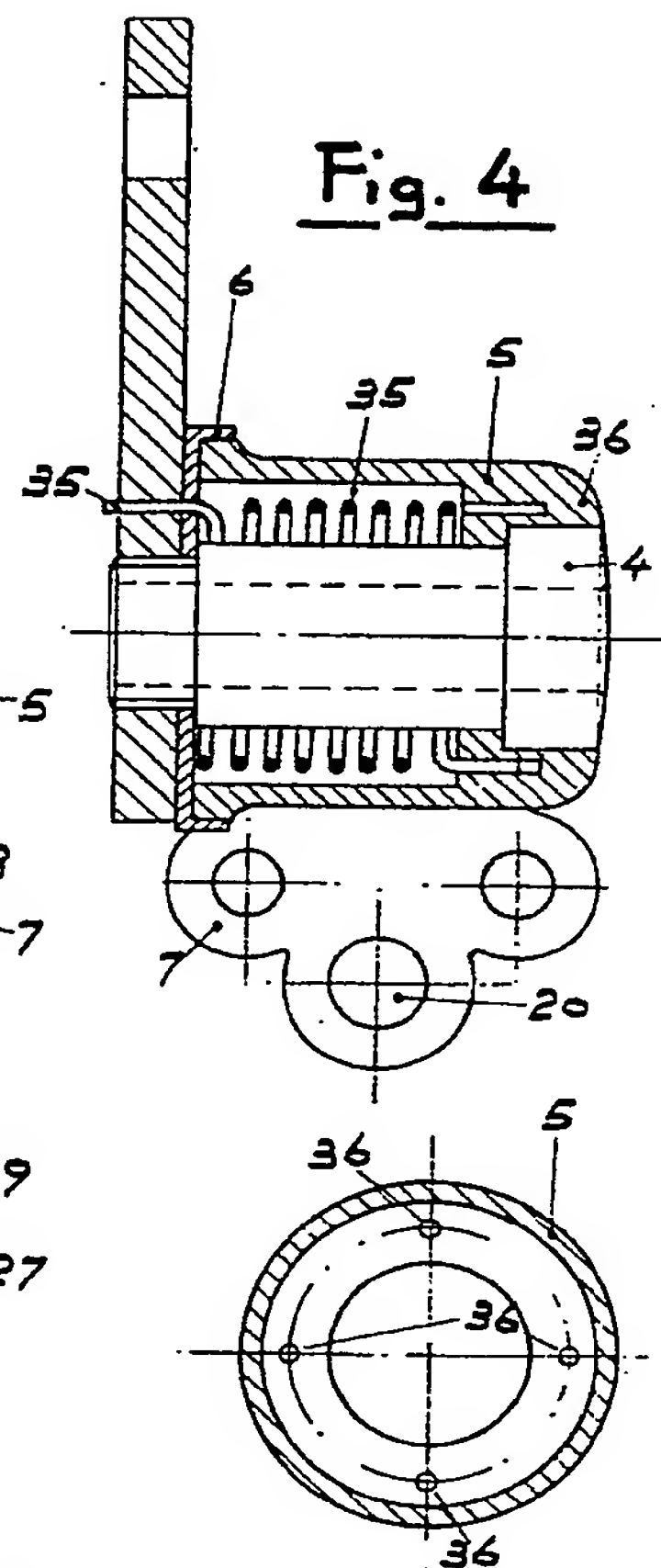


Fig. 4

Fig. 5

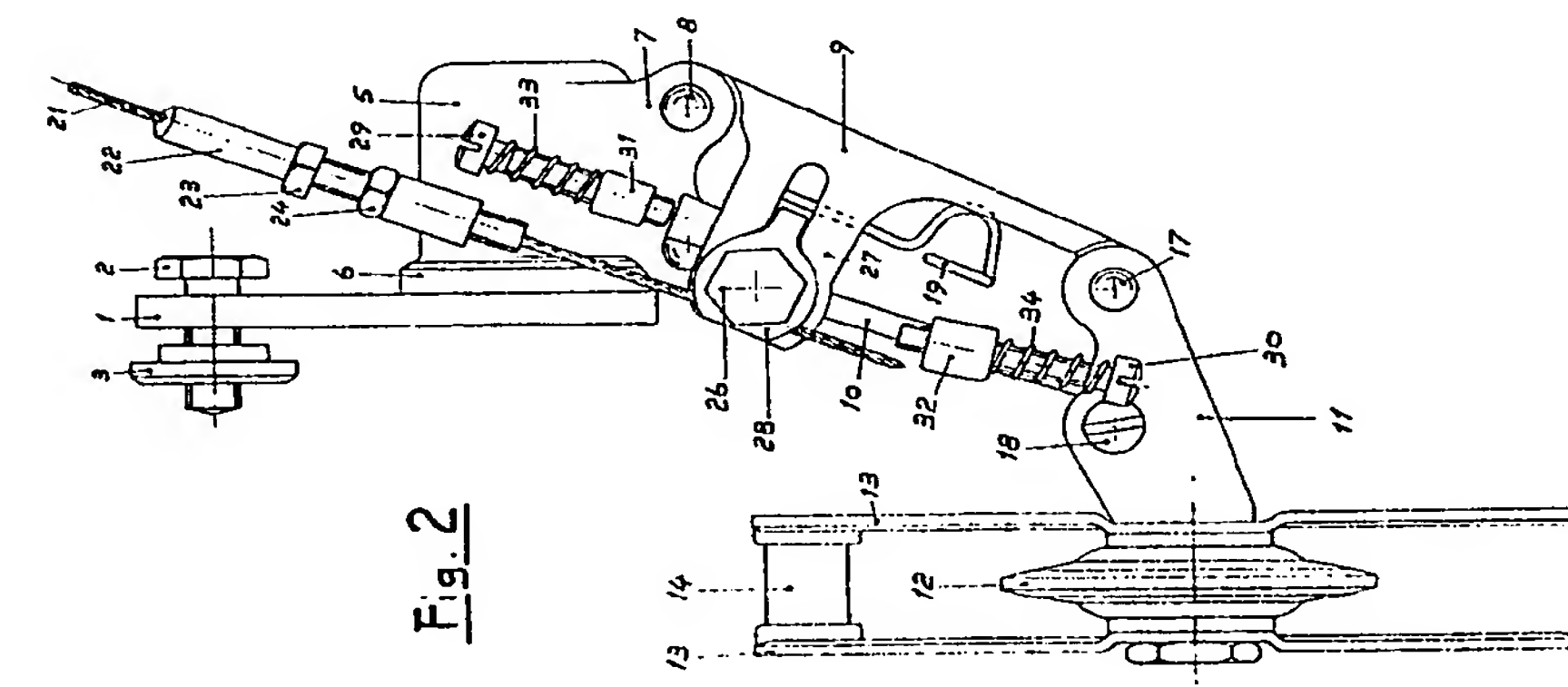


Fig. 2

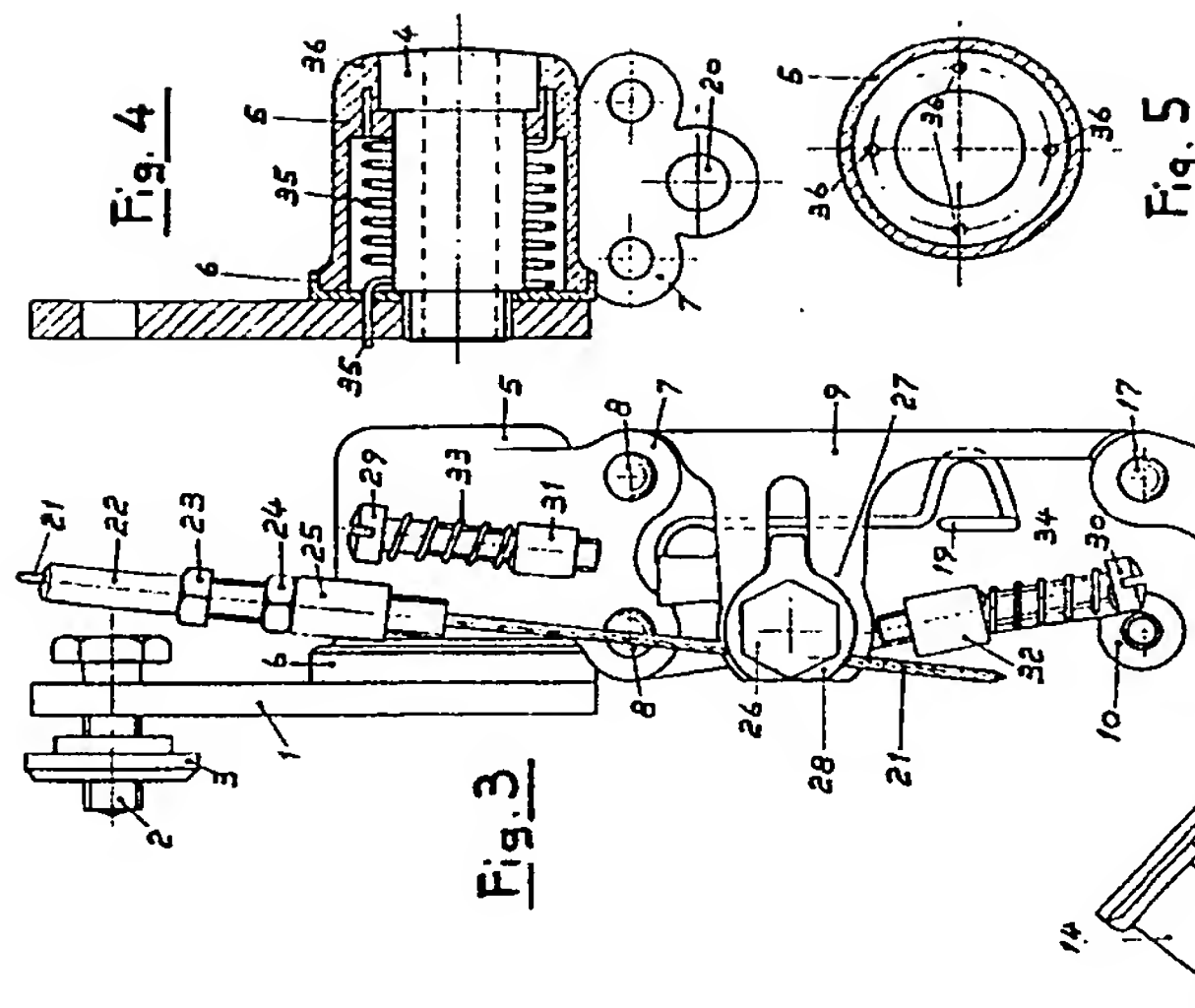


Fig. 3

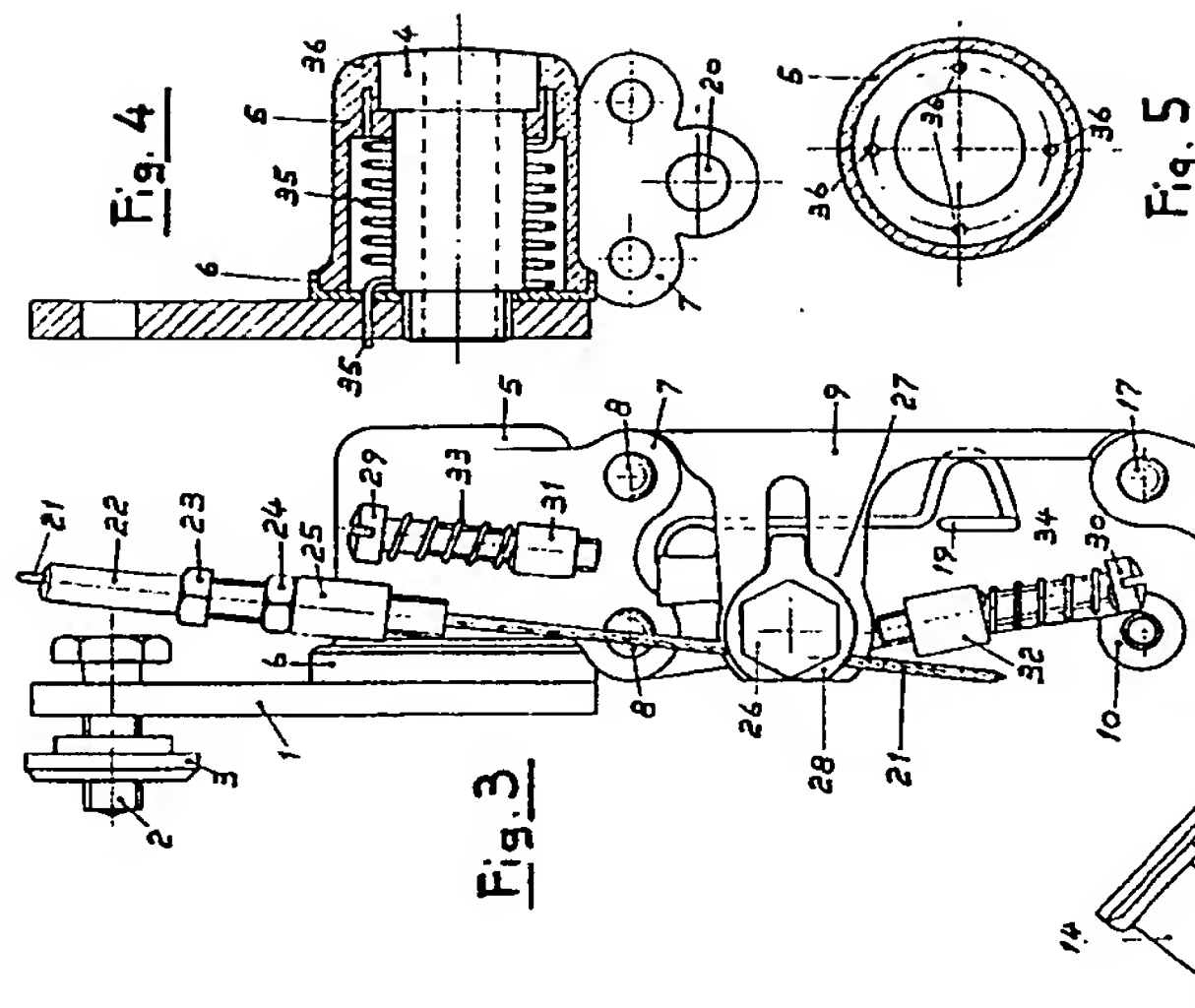


Fig. 4

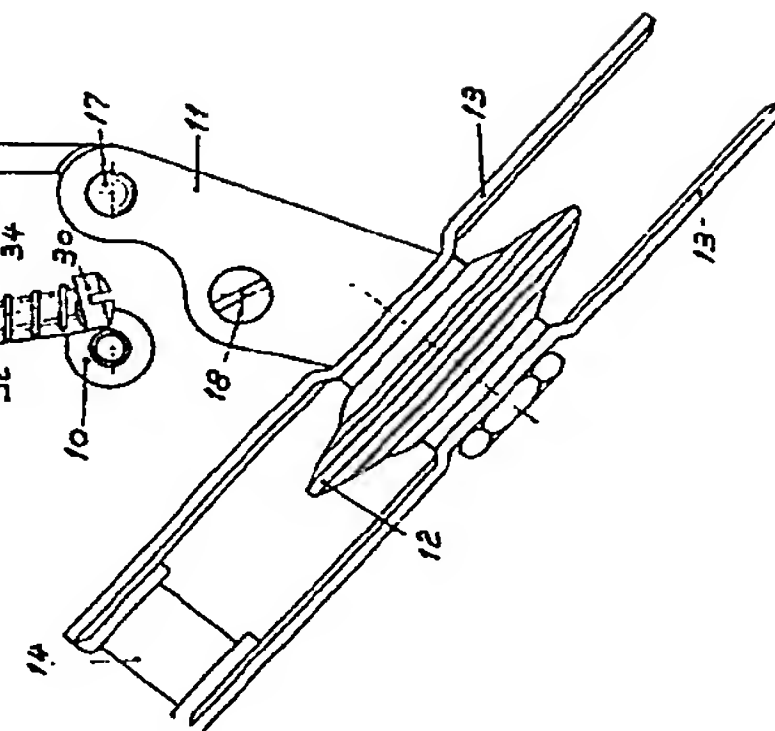


Fig. 5

